CLAIMS

What is claimed is:

1. A liquid-cooled welding device, comprising:

a torch head body operable to conduct electricity to a welding electrode disposed therein, the torch head body having a helical cooling fin extending along a length of the torch head body;

a sleeve disposed around the torch head body, wherein the sleeve has a liquid inlet and a liquid outlet to enable a liquid to flow over the torch head body, the liquid outlet being disposed adjacent to the liquid inlet; and

a baffle disposed within the sleeve between the liquid inlet and the liquid outlet to direct the liquid to flow along the length of the torch head body to enable the helical cooling fin to transfer heat to the liquid.

2. The welding device as recited in claim 1, comprising a liquid supply line coupled to the liquid inlet and a liquid return line coupled to the liquid outlet.

3. The welding device as recited in claim 2, wherein the helical cooling fin induces the liquid to flow helically around the torch head body from the liquid inlet to an end of the baffle.

4. The welding device as recited in claim 2, wherein the liquid flows helically around the torch head body from an end of the baffle to the liquid outlet.

5. The welding device as recited in claim 2, comprising a gas supply line coupled to a passageway in the torch head body.

6. The welding device as recited in claim 5, comprising a handle removably secured to the torch head body over the first cooling liquid supply line, the cooling liquid return line, and the gas line.

7. The welding device as recited in claim 1, wherein liquid flows from the liquid inlet to the end of the baffle in an annular fluid channel defined by an inner surface of the baffle and an inner surface of the sleeve.

8. The welding device as recited in claim 1, wherein the torch head body comprises:

an axial channel extending through the torch head body to enable the torch head body to receive a welding electrode; and

a gas inlet extending through a side of the torch head body into the hollow interior to enable gas to enter the axial channel and flow through the axial channel around the welding electrode.

9. The welding device as recited in claim 8, wherein the gas inlet is disposed adjacent to the liquid inlet and the liquid outlet.

10. The welding device as recited in claim 9, wherein gas flows through the axial channel in the same axial direction as the cooling liquid flows from the liquid inlet to the end of the baffle.

11. A liquid-cooled welding torch, comprising:

an electrically-conductive torch head body comprising:

at least one cooling fin extending around the torch head body; and

a channel extending through the torch head body to enable the torch head body to receive gas and a welding electrode therein; and

an electrically-conductive sleeve disposed concentrically around the torch head body to enable a liquid to flow over the at least one cooling fin,

wherein the sleeve is electrically coupled to the torch head body to enable electricity to flow from the sleeve to the welding electrode via the torch head body.

12. The liquid-cooled welding torch as recited in claim 11, wherein the at least one cooling fin extends helically around the torch head body.

13. The liquid-cooled welding torch as recited in claim 12, wherein the sleeve comprises a liquid inlet and a liquid outlet disposed proximate to the liquid inlet.

14. The liquid-cooled welding torch as recited in claim 13, comprising a baffle disposed within the sleeve between the liquid inlet and the liquid outlet to direct liquid to flow over the at least one cooling fin.

15. The liquid-cooled welding torch as recited in claim 12, comprising a first tube coupled to the liquid inlet, a second tube coupled to the liquid outlet, and a gas tube coupled to a passageway into the interior of the torch head body.

16. The liquid-cooled welding torch as recited in claim 15, comprising a handle disposed over the first tube, the second tube, and the gas tube.

17. The liquid-cooled welding torch as recited in claim 15, wherein liquid flows over the at least one cooling fin in the same direction as gas flows thorough the interior of the torch head body.

18. A method of manufacturing a welding torch, comprising:

disposing a cylindrical sleeve and a baffle over a torch head body having a helical cooling fin extending around the surface of the torch head body.

19. The method as recited in claim 18, comprising disposing the baffle within the interior of the cylindrical sleeve between a first opening through the sleeve and a second opening through the sleeve.

20. The method as recited in claim 19, wherein disposing the baffle comprises compressing the baffle to insert a pair of baffle flanges within a pair of grooves in the sleeve.

21. The method as recited in claim 18, comprising disposing a conductive member between the sleeve and the torch head body.

22. The method as recited in claim 21, comprising brazing the sleeve to the torch head body.

23. A method of cooling a welding torch, comprising:

directing a cooling liquid to flow from a first end of the torch head to a second end of the torch head over at least one helical cooling fin of a torch head body ; and

directing the cooling liquid to flow from the second end of the torch head back to the first end of the torch head.

24. The method as recited in claim 23, wherein liquid enters the welding torch adjacent the first end of the torch head.

25. The method as recited in claim 23, wherein liquid enters the welding torch adjacent the second end of the torch head.

26. The method as recited in claim 23, wherein directing a cooling liquid comprises liquid enters the welding torch adjacent the second end of the torch head.

27. The method as recited in claim 23, wherein directing the cooling liquid to flow from the second end of the torch head to the first end of the torch head comprises directing the cooling liquid to flow through a coolant channel that bypasses the at least one helical cooling fin.

28. A torch head body for a liquid-cooled welding torch, comprising:

a channel extending axially through the torch head body to enable a welding electrode to be received within the torch head body;

a first cylindrical surface extending around a first portion of the torch head body to form a mating surface for a cylindrical sleeve disposed over the torch head body to define a liquid flow channel; and

a helical cooling fin extending around a second portion of the torch head body to enable heat within the torch head body to be transferred to a liquid flowing through the liquid flow channel.

29. The torch head body as recited in claim 28, comprising a passageway extending through a side of the torch head body to enable gas to enter the channel.

30. The torch head body as recited in claim 28, wherein the torch head body comprises a rigid metal.

31. The torch head body as recited in claim 30, comprising a threaded portion to enable a sealing member to seal one end of the channel.